Ruggcore™ REC4312/REC4313/REC4314/REC4316

User Manual

Ruggdized Box PC

AMD® G-Series Processor

(1st Edition 3/7/2013)

All information is subject to change without notice.

Approved by	Checked by	Prepared by

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RECORD OF REVISION

Version and Date	Page	Old Description	New Description	Remark
Mar,7,2013	all		Initial Release	

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Packing List

Before installation, please ensure the following items have been shipped:

- 1 x REC431X Box PC
- 1 x 2GB DDR3 ram
- 1 x DVD-ROM for drivers

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

Ordering Information

Model Number Description

REC4316-A01
AMD T56N 1.65 GHz,2GB DDR3.RJ45*2,VGA,HDMI,USB*6.COM*4,HDD Bay 2.5,mini card.9~36V,V01

REC4314-A01
AMD T40N 1.0GHz,2GB DDR3.RJ45*2,VGA,HDMI,USB*6.COM*4,HDD Bay 2.5,Mini card.9~36V,V01

REC4313-A01
AMD T40R 1.0GHz,2GB DDR3.RJ45*2,VGA,HDMI,USB*6.COM*4,HDD Bay 2.5,mini card.9~36V,V01

REC4312-A01
AMD T16R 615MHz,2GB DDR3.RJ45*2,VGA,HDMI,USB*6.COM*4,HDD Bay 2.5,Mini card.9~36V,V01

Optional Accessories

- 2.5” 250GB SATA Hard Disk Drive
- 8GB CFast Memory Card
- ADAPTER,12V,7.0A,84W.
- Power Cable USA Type
- Power Cable Europe Type
- Power Cable Australia Type
- Power Cable Europe Type

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a firm surface during installation. Dropping it or letting it fall could cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
11. Never pour any liquid into an opening. This could cause fire or electrical shock.
12. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
13. If any of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
14. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 70°C (158°F). IT MAY DAMAGE THE EQUIPMENT.

FCC Safety

This device complies with Part 15 FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received including interference that may cause undesired operation.

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1.0 INTRODUCTION

1.1 About Ruggcore™ Box PC

Due to the growing popularity from the IPC market, the newest Ruggcore™ series REC431X Box PC have been launched. It is based on AMD Fusion technology delivers a complete, full-feature embedded platform and incorporate the new low-power, x86 CPU with a world-class DirectX 11-capable GPU on a single piece of silicon. It is the perfect solution for application that require low power and significant graphic performance in a small form factor. REC431X integrate high performance solutions, support system memory DDR3 up to 4GB, three types of storage device are considered, SATA interface, mSATA and CFast. High speed internet connectivity, it offers two ports of Gigabit Ethernet. And rich IO interface, 4 COM ports, 6 USB. It provide twp types of display interface, VGA and HDMI. REC431X series is a great choice for customers who used Ruggcore Box PC for high performance, multi-media and small form factor. It is ideal for applications such as industrial control, digital signage, transportation, POS, information Kiosk, medical, and factory automation.

REC4316 is a new series of embedded PC system to be the optimal industrial solution. The survice from the harsh and grim working environment, the rugged and anti-vibration structure support REC431X to be the best choice. In addition, the fanless design controller takes low power consumption..

A solid sealed aluminum case provides vibration and dust resistance while also providing a passive cooling solution. The REC4316 provides system integrators with a turn-key solution and versatile application development path to fulfill the diversified market demand.

The REC4316 can be used as a standalone system, and wall-mounted. The system accepts a wide range of power supplies (DC power in). The rugged aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but also passive cooling for quiet fanless operation.

1.2 FEATURES

- Compact Size and Rugged Fanless Platform.
- Onboard Intel AMD Fusion G-Series Processor.
- DDR 3 RAM
- Two Gigabit Ethernet.
- Internal 2.5” SATA HDD Bay
- USB 2.0 port x6, Com port x 4
- CFast Slot x 1
- Industrial Grade Rugged Chassis

1.3 SPECIFICATIONS:

System

	Model Name	APU	GPU
Processor	REC4316	T56N (1.65GHz) Dual Core	HD6320
	REC4314	T40N (1.0GHz) Dual Core	HD6290
	REC4313	T40R (1.0GHz) Single Core	HD6250
	REC4312	T16R (615MHz) Single Core	HD6250

Chip Set	AMD A55E
System Memory	204-pin SODIMM x1, Max. 4GB DDR3-1333 (DDR3-1333 for REC4316)
Ethernet	Speed: 10/100/1000 Base-TX, Controller: x2 Intel® 82583V Connector: x2 RJ45 on rear IO side
Storage	SATA (3.0G/s) x2 ,CFast x1 mSATA optional (support either mSATA or full size mini card) x1
Audio	MIC-In,Line-out
I/O Interface-Front	RJ45 x2, USB x2, COMx2(RS232x1, RS232/422/485 x1), VGAx1, HDMI x1, Audio Phone Jack x 2(Line-Out, MIC In)
I/O Interface-Rear	USBx4,COMx2 (RS232 x2), Power Switch, DC-In, HDD Bay
BIOS	AMI Plug & Play BIOS
Watchdog Timer	Generates a time-out system reset
Expansion Interface	Mini Card slot x1 (internal), Cfast Slot x1(internal)
Wake On LAN	YES
Full Loading Power Consumption	26.6W (REC4316 / REC4314 / REC4313) 12.6W (REC4312)

Mechanical

Construction	Rugged Aluminum Alloy chassis
Mounting	Wallmount, Desktop
Dimension	306.5(W) x 146(H) x 47(D) mm
Net Weight	1.5Kg

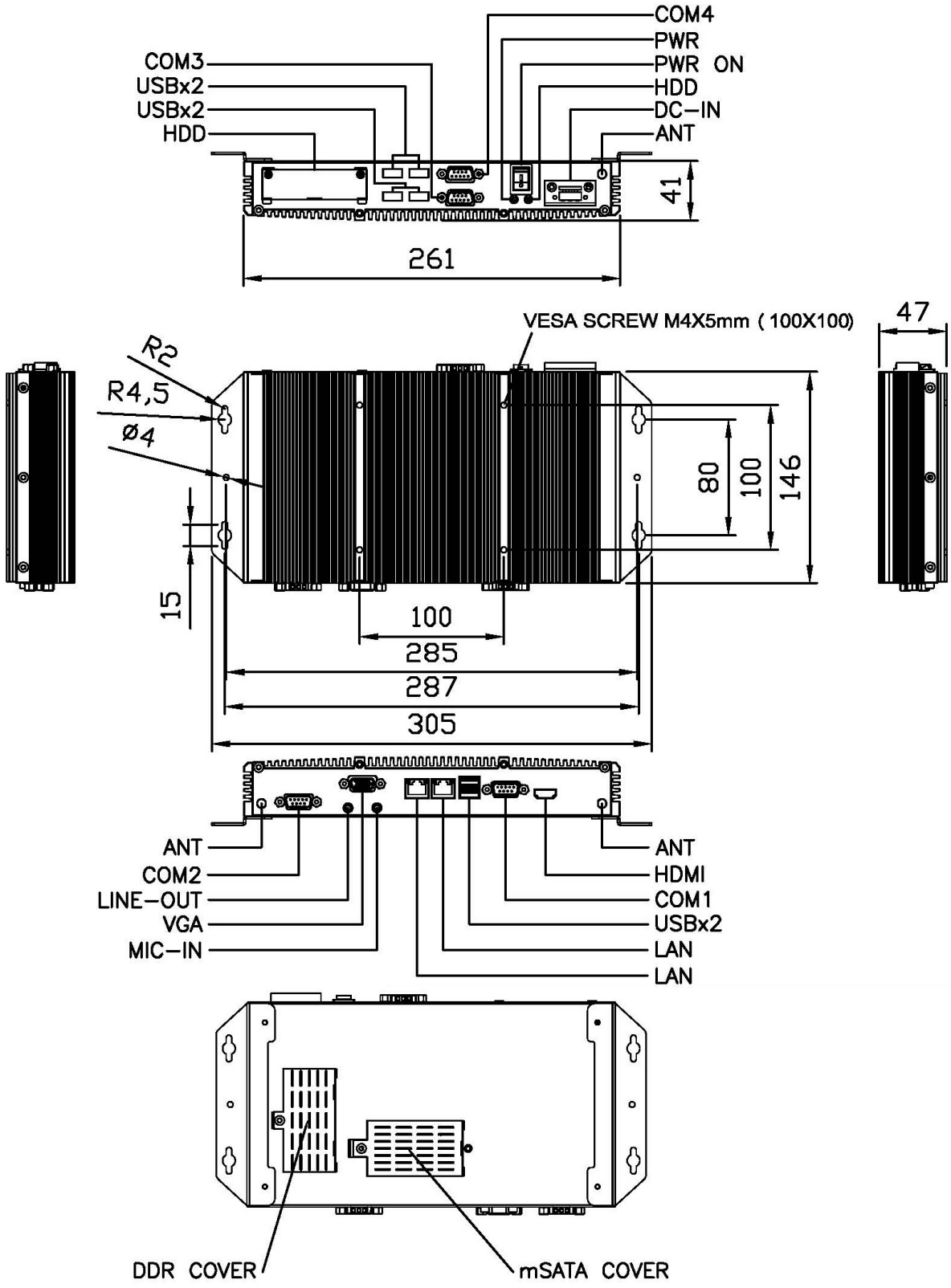
Environment

Operating Temperature	-15°C ~ 50°C (5°F ~ 131°F) – HDD
Storage Temperature	-20°C ~ 70°C (-4°F ~-158°F)
Operating Humidity	5~90% @ 40°C, non-condensing
Vibration:	1g rms / 5~500Hz / random operation
Shock:	20g peak acceleration (11msec. duration) (HDD)
Certification	CE/FCC Class A

2.0 HARDWARE INSTALLATION

General System Information

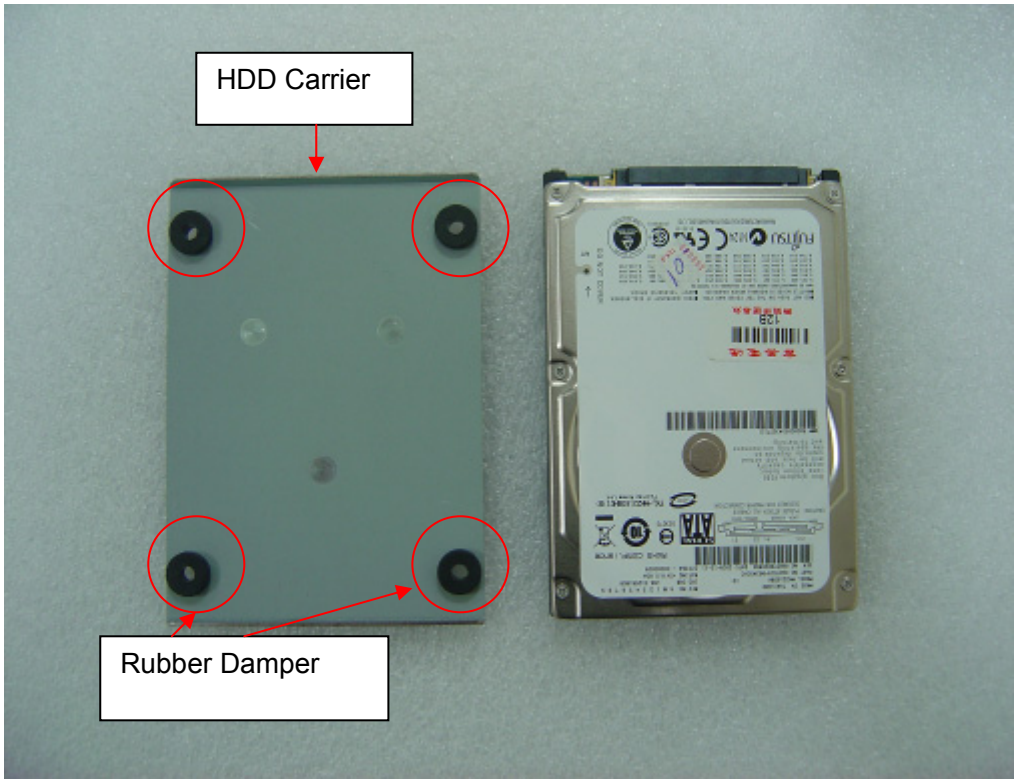
Mechanical Drawing



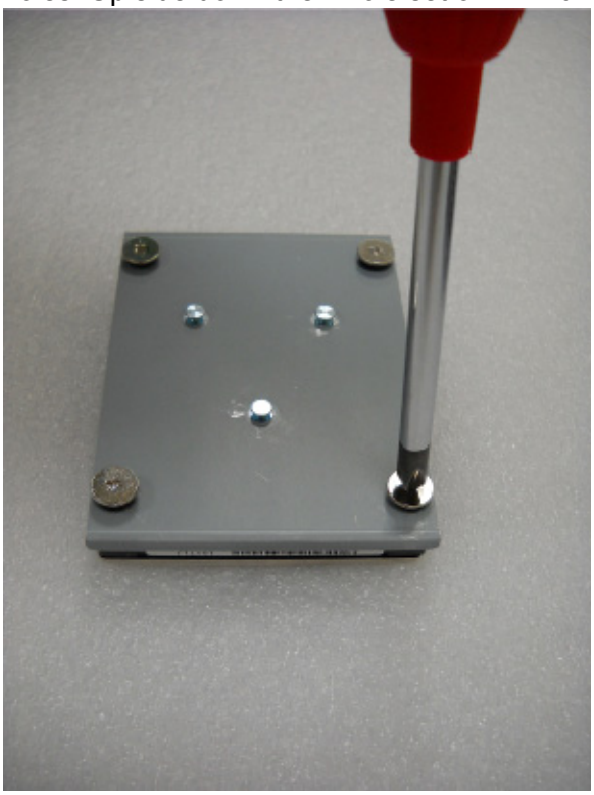
Installation Hard Disk Drive

Step1: Please make sure the power is off before install HDD.

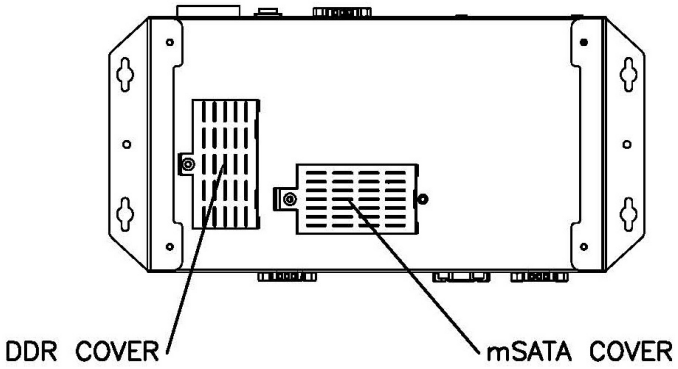
Step2: Please find HDD carrier and four rubber dampers, and put the dampers on the corner of carrier.



Step3: Put the HDD on the top of carrier and align the HDD screw holes and carrier screw holes. Up side down the whole set of HDD and fasten the four screws on the bottom side.



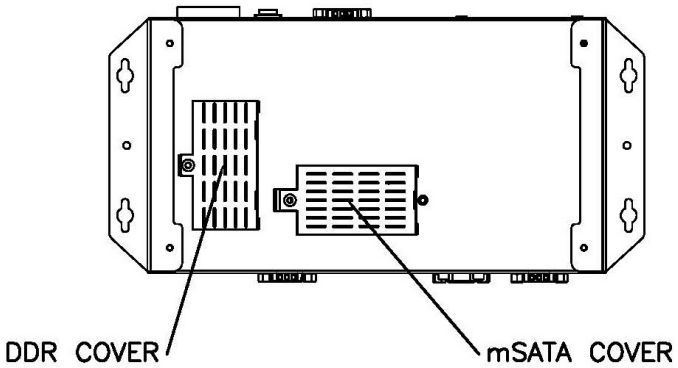
Step4: Unfasten the screws of HDD cover on the front side of REC431X.



Step5: Insert the HDD set to the HDD bay, the connectors between HDD and HDD bay will be connected when slide in the HDD at the end.

Step6: Fasten the two screws of HDD cover.

mSATA Installation



Step1: Please make sure the power is off before install mSATA.

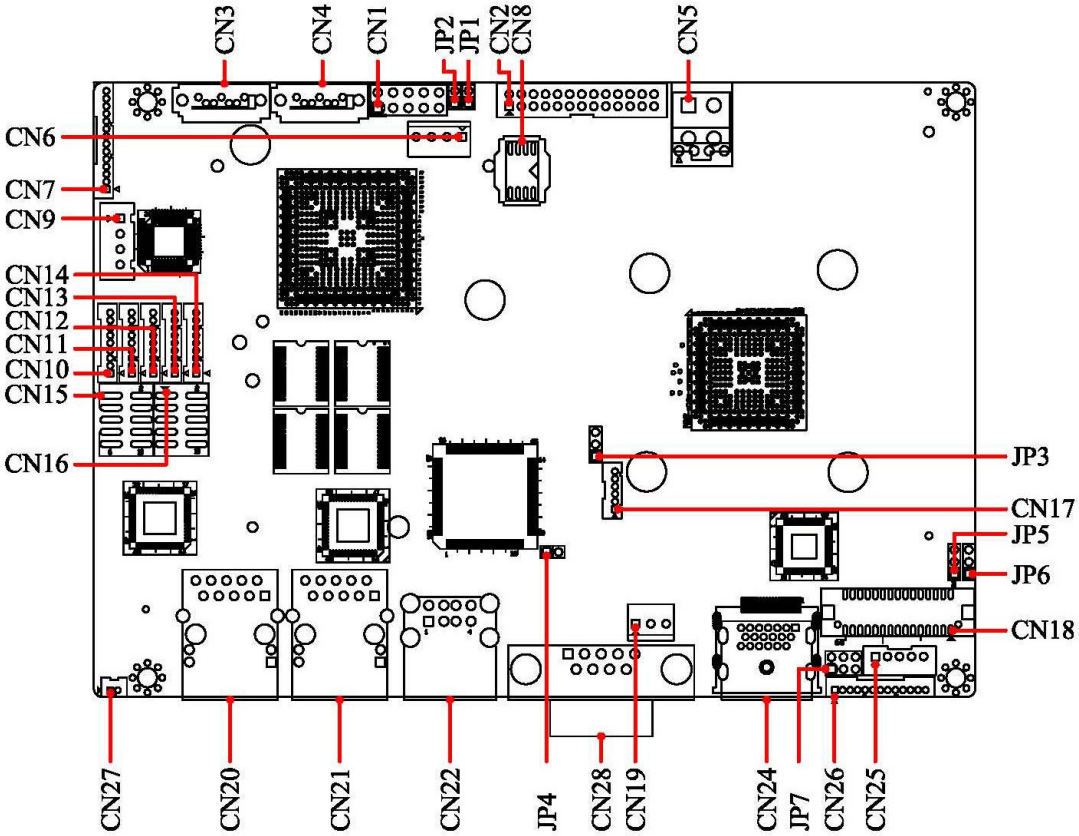
Step2: Unfasten the two screws of mSATA cover on the bottom side of REC431X.

Step3: Insert the mSATA card to mSATA slot.

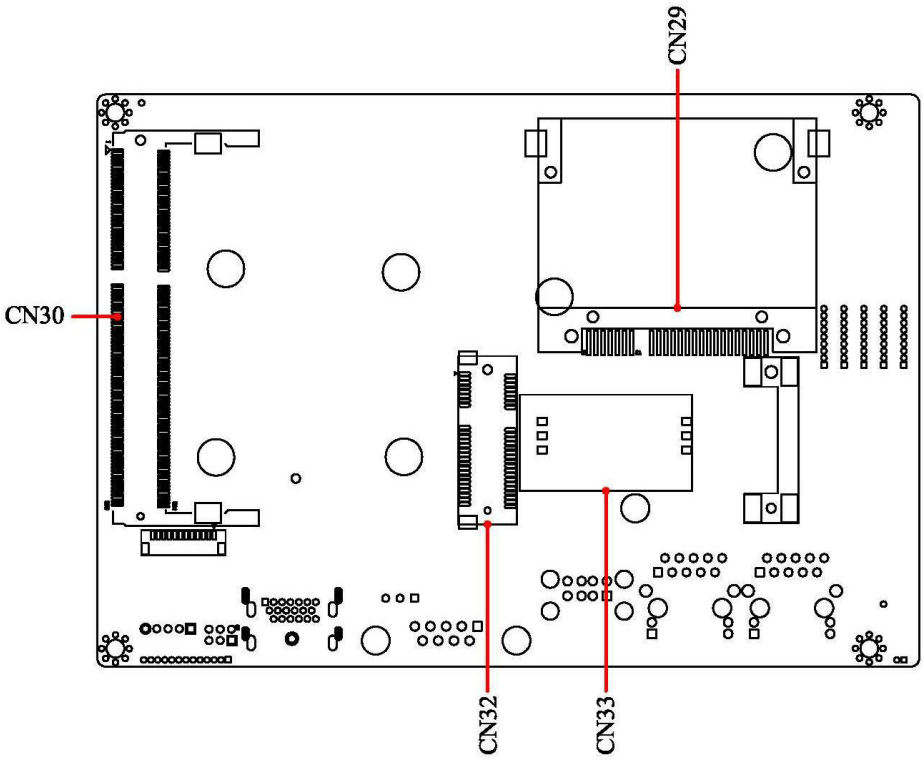
Step4: Fasten the mSATA cover screws.

Main Board Location of Connectors and Jumpers

Component Side



Solder Side



List of Jumpers

The board has a number of Jumpers that allow you to configure your system to suit your application.

Label	Function
JP1	Power pin7 for SATA DOM
JP2	Power pin7 for SATA DOM
JP3	Clear CMOS
JP4	AT/ATX Power mode
JP5	LCD Backlight Voltage Selection
JP6	LCD panel Voltage Selection
JP7	COM2 Ring/+5V/+12V Selection

List of Connectors

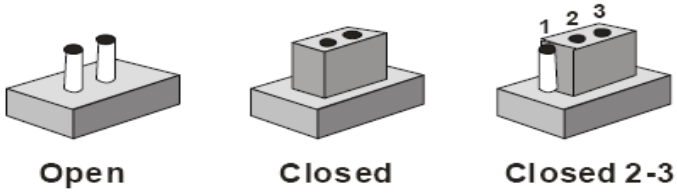
The board has a number of Jumpers that allow you to configure your system to suit your application.
The table below shows the function of the board's connectors:

Label	Function
CN1	Front Panel
CN3	SATA connector
CN4	SATA connector
CN5	ATX 4Pin Power Connector
CN6	SATA Power Connector
CN7	Audio Connector
CN9	Speaker Connector
CN10	COM1 Connector
CN11	COM5 Connector
CN12	COM6 Connector
CN13	COM3 Connector
CN14	COM4 Connector
CN15	USB Connector
CN16	USB Connector
CN17	PS2 KB/MS Connector
CN18	LVDS Connector
CN19	FAN Connector
CN20	GIGA LAN
CN21	GIGA LAN
CN22	USB Dual Port Connector
CN24	HDMI Connector
CN25	Backlight Connector

CN26	VGA Connector
CN27	Battery Connector
CN28	COM2 Connector
CN29	CFast Connector
CN30	DDR3 Connector
CN32	Mini Card
CN33	SIM Card

Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.
To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.
Generally, you simply need a standard cable to make most connections.

Pin7 Power Selection for SATA DOM

JP1、JP2	Function	
1-2 Closed	Pin7 with power	
1-2 Open	Pin7 without power	(Default)

Clear CMOS Selection

JP3	Function	
1-2	Normal	(Default)
2-3	Clear CMOS	

AT/ATX Selection

JP4	Function	
1-2 Closed	AT	(Default)
1-2 Open	ATX	

LCD Backlight Voltage Selection

JP5	Function	
1-2	+5V	(Default)
2-3	+12V	

LCD Panel Voltage Selection

JP6	Function	
1-2	+5V	
2-3	+3.3V	(Default)

COM2 Ring/+5V/+12V Selection

JP7	Function	
1-2	+12V	
3-4	Ring	(Default)
5-6	+5V	

Connector Pin Assignment

Front Panel Connector (CN1)

Pin	Signal
1	GND
2	PWR_BTN(-)
3	HDD_LED(-)
4	+3.3V
5	Buzzer
6	+5V
7	GND
8	PWR_LED(+)
9	GND
10	Reset(-)

ATX 4Pin Power Connector (CN5)

Pin	Signal
1	NC
2	GND
3	GND
4	+12V

SATA Power Connector (CN6)

Pin	Signal
1	+12V
2	GND
3	GNF
4	+5V

Audio Connector (CN7)

Pin	Signal
1	MIC
2	MIC_VREF
3	GND
4	GND
5	LINEIN_L
6	NC
7	LINEIN_R
8	GND
9	GND
10	NC
11	LINEOUT_L
12	LINEOUT_R
13	GND
14	GND

Speaker Connector (CN9)

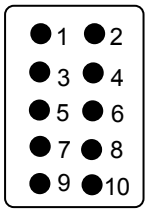
Pin	Signal
1	SPK_R-
2	SPK_R+
3	SPK_L+
4	SPK_L-

RS-232 Serial Port Connector (CN10、CN11、CN12、CN13、CN14)

Pin	Signal
1	DCD#
2	DSR#
3	RXD
4	RTS
5	TXD
6	CTS#
7	DTR#
8	RI#
9	GND

USB Connector (CN15,CN16)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	DATA0-	4	GND
5	DATA0+	6	DATA1+
7	GND	8	DATA1-
9	GND	10	+5V



PS2 Keyboard and Mouse Connector (CN17)

Pin	Signal
1	KBDATA
2	KBCLK
3	GND
4	+5V
5	MSDATA
6	MSCLK

LVDS Connector (CN18)

Pin	Signal	Pin	Signal
1	LVDS_BKLEN	2	LVDS_BKLCTL
3	PPVCC	4	GND
5	LVDS_TXLCLK#	6	LVDS_TXLCLK
7	PPVCC	8	GND
9	LVDS_TXL0#	10	LVDS_TXL0
11	LVDS_TXL1#	12	LVDS_TXL1
13	LVDS_TXL2#	14	LVDS_TXL2
15	LVDS_TXL3#	16	LVDS_TXL3
17	LVDS_DDCPDATA	18	LVDS_DDCPCLK
19	LVDS_TXU0#	20	LVDS_TXU0
21	LVDS_TXU1#	22	LVDS_TXU1
23	LVDS_TXU2#	24	LVDS_TXU2
25	LVDS_TXU3#	26	LVDS_TXU3
27	PPVCC	28	GND
29	LVDS_TXUCLK#	30	LVDS_TXLCLK

Fan Connector (CN19)

Pin	Signal
1	GND
2	Fan control
3	Fan-IN

Backlight Connector (CN25)

Pin	Signal
1	Backlight Voltage Input
2	Backlight control
3	GND
4	GND
5	Backlight Enable

VGA Connector (CN26)

Pin	Signal
1	VSYNC
2	HSYNC
3	GND
4	DDC_SCL
5	DDC_SDA
6	CRT_PLUG
7	BLUE
8	GND
9	GREEN
10	GND
11	RED
12	GND
13	+5V

Battery Connector (CN27)

Pin	Signal
1	RTCBAT
2	GND

3.0 AMI BIOS SETUP

AMI BIOS Setup

AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM so that it retains the Setup information when the power is turned off.

Entering Setup

Power on the computer and press <Del> or <F2> immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Enable disable boot option for legacy network devices.

Chipset

host bridge parameters.

Boot

Enables/disable quiet boot option.

Security

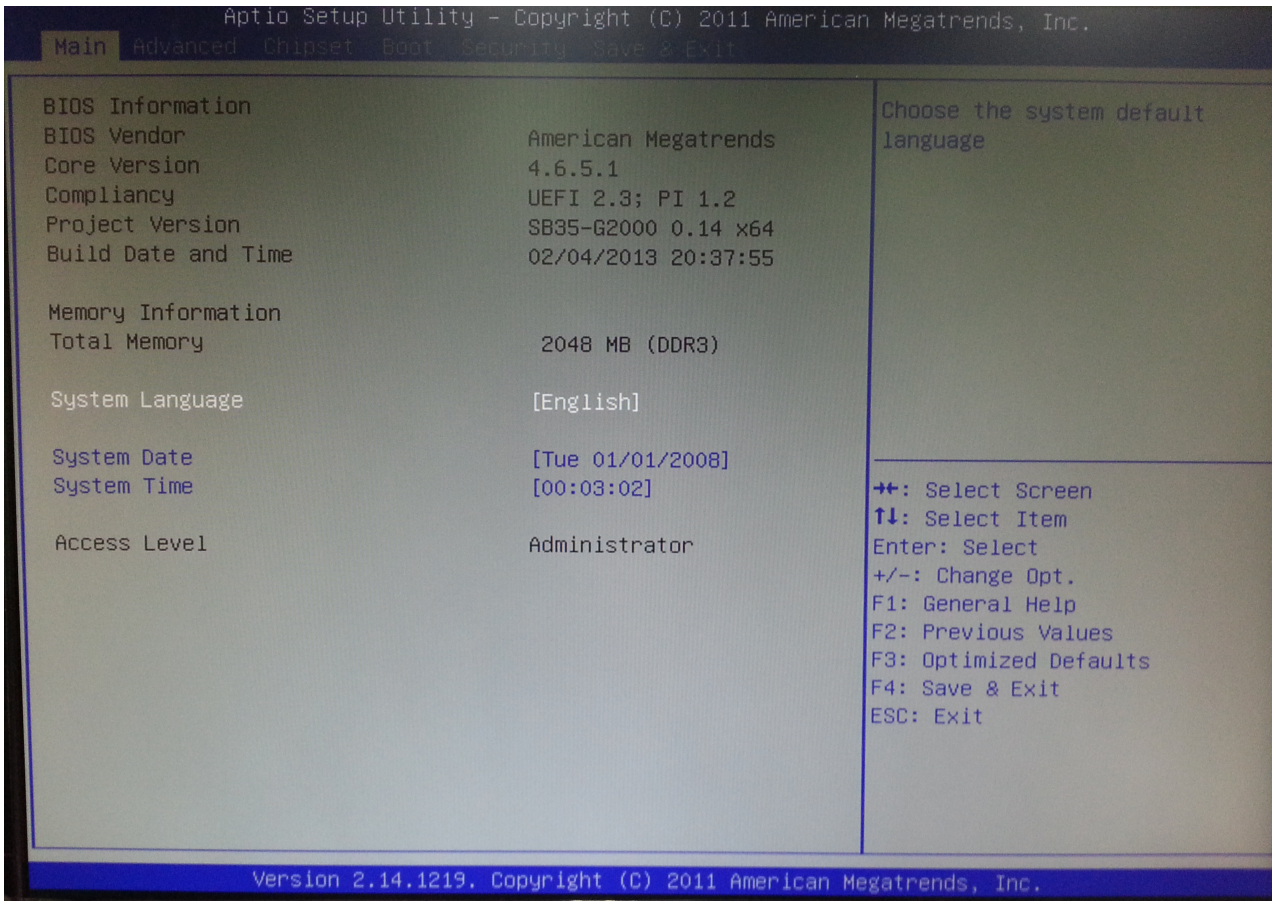
Set setup administrator password.

Save&Exit

Exit system setup after saving the changes.

Setup 1: The Main BIOS Menu.

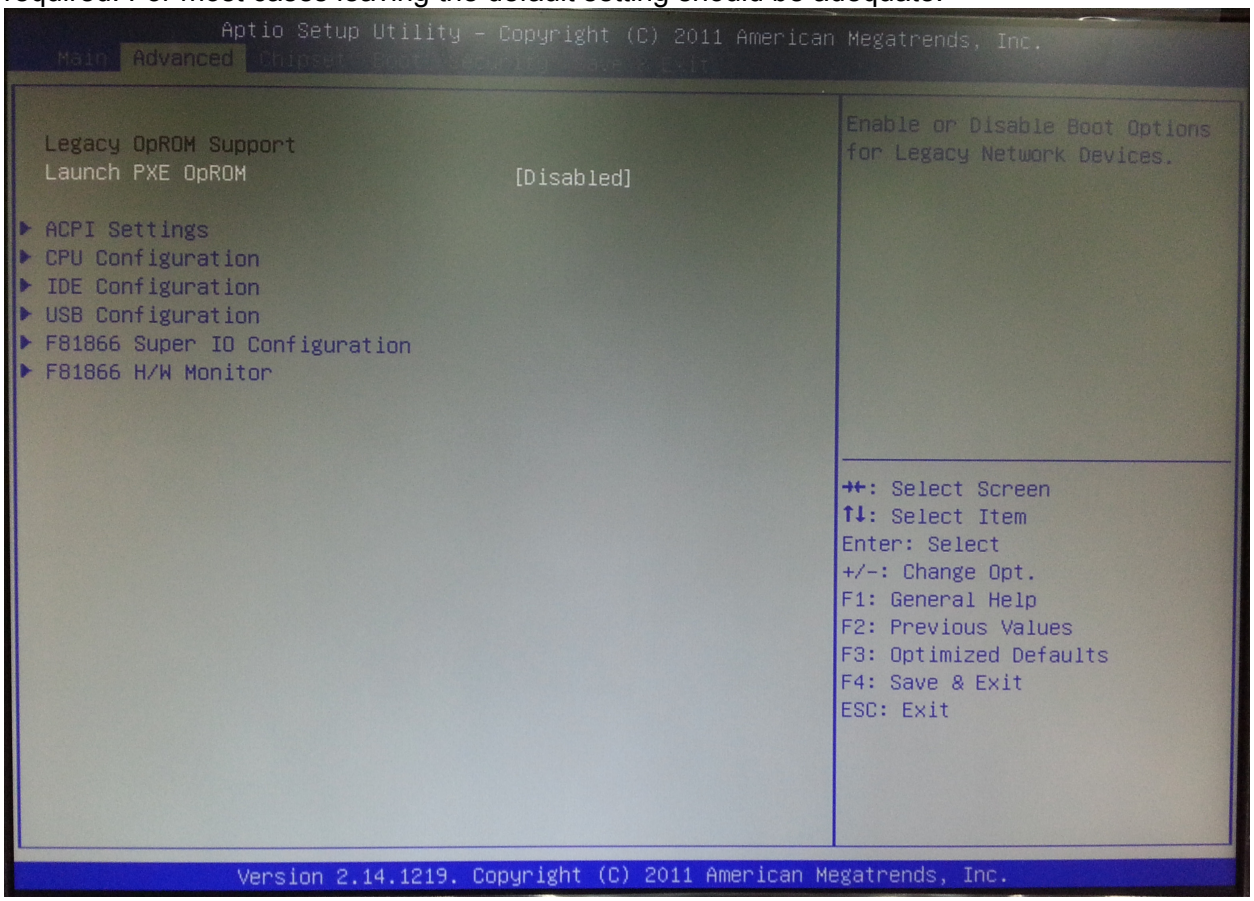
The sections that follow provide guidelines on how to set up the various settings in each section of the BIOS. We have concentrated only on those settings that may need changing, if a setting does not appear in this document, leave it as you found it.
Press Enter on a main menu option to go into that section.
To return to the Main Menu from within a section, press Escape.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
BIOS Information
BIOS Vendor American Megatrends
Core Version 4.6.5.1
Compliancy UEFI 2.3; PI 1.2
Project Version SB35-G2000 0.14 x64
Build Date and Time 02/04/2013 20:37:55
Memory Information
Total Memory 2048 MB (DDR3)
System Language [English]
System Date [Tue 01/01/2008]
System Time [00:03:02]
Access Level Administrator
Choose the system default language
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

▲The Main BIOS Menu

Setup 2: Advanced BIOS Features

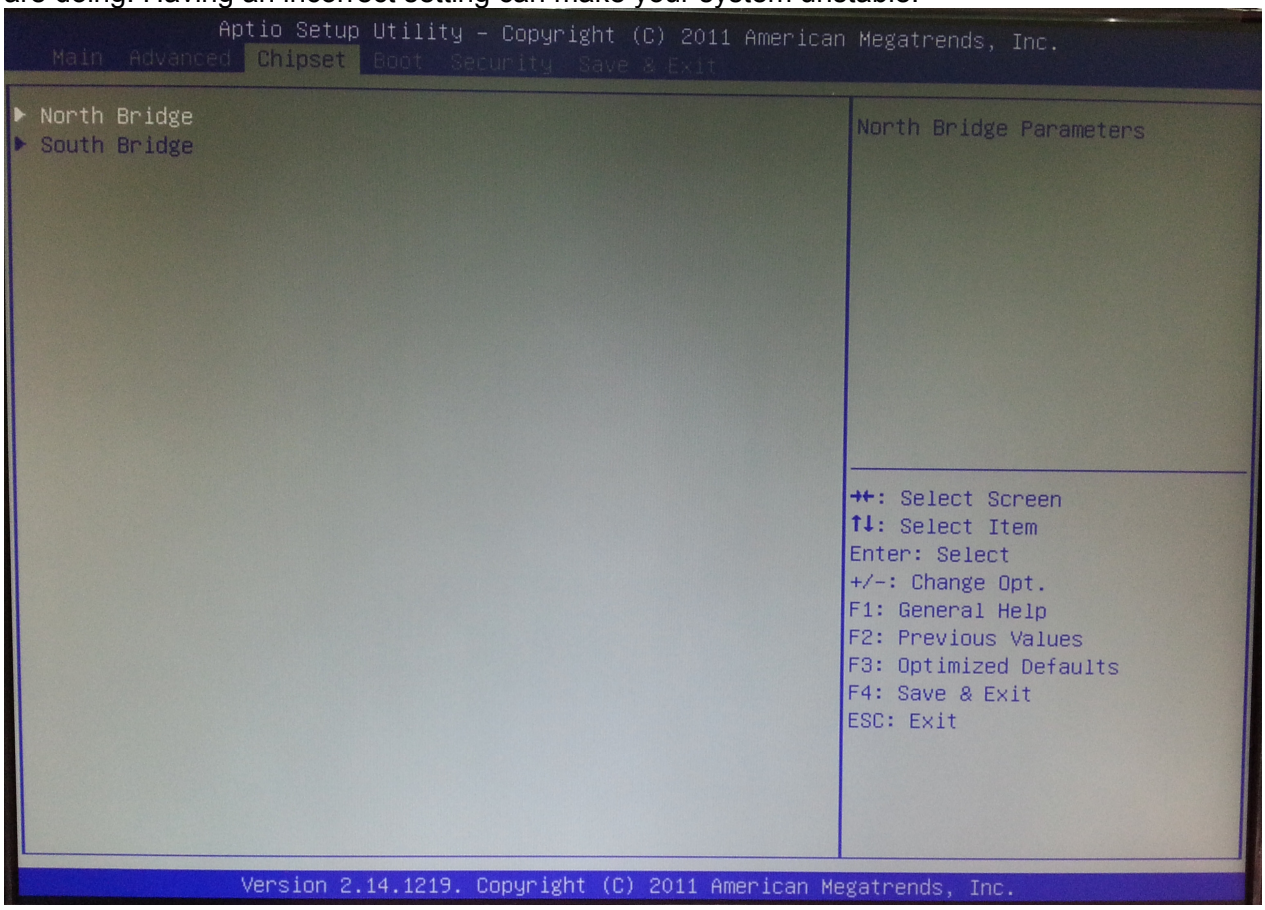
As you can see from screen 2, there are numerous advance settings which you can select if required. For most cases leaving the default setting should be adequate.



▲ Advanced BIOS Features

Setup 3: Chipset

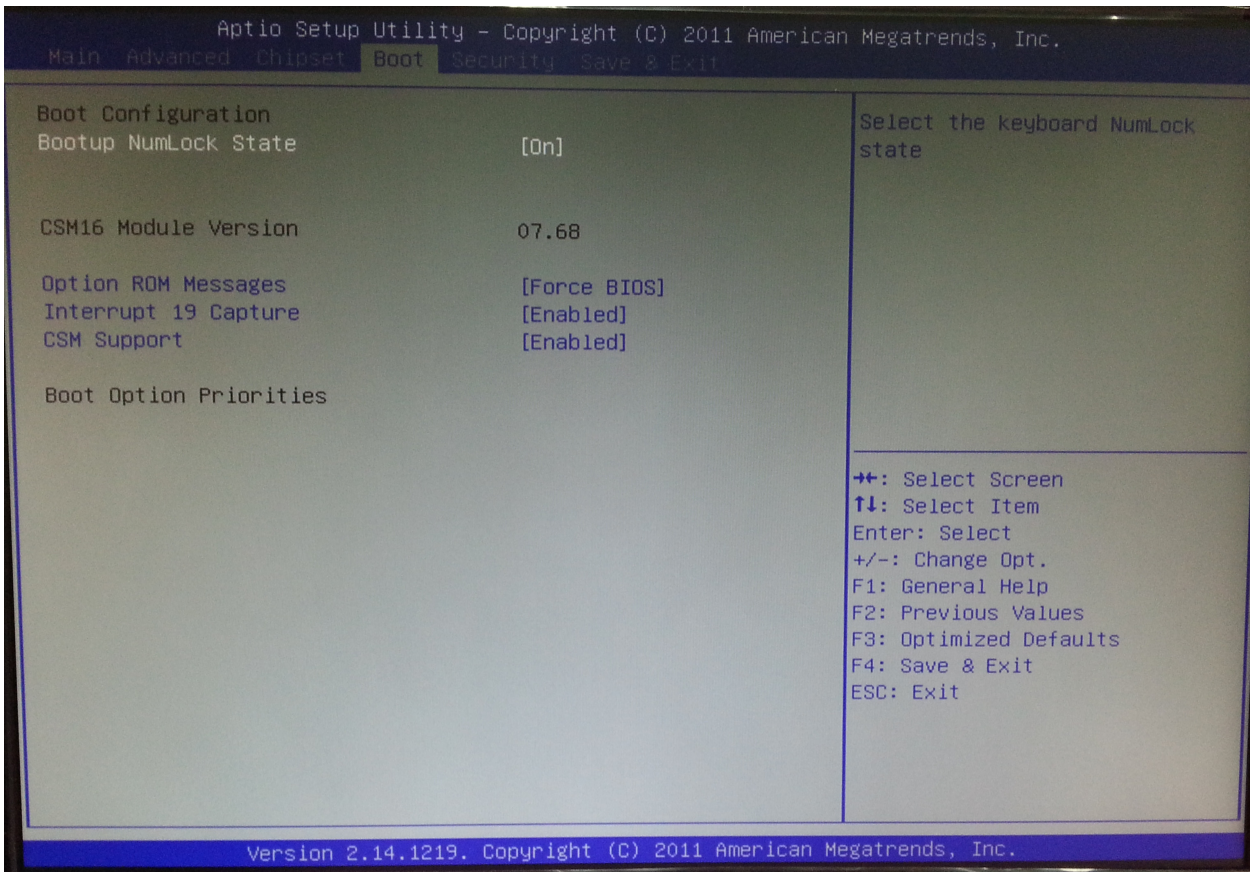
Here you can setup the contents of the chipset buffers. It is closely related to the hardware and is therefore recommended that you leave the default setting unless you know what you are doing. Having an incorrect setting can make your system unstable.



▲ Chipset

Setup 4: Boot

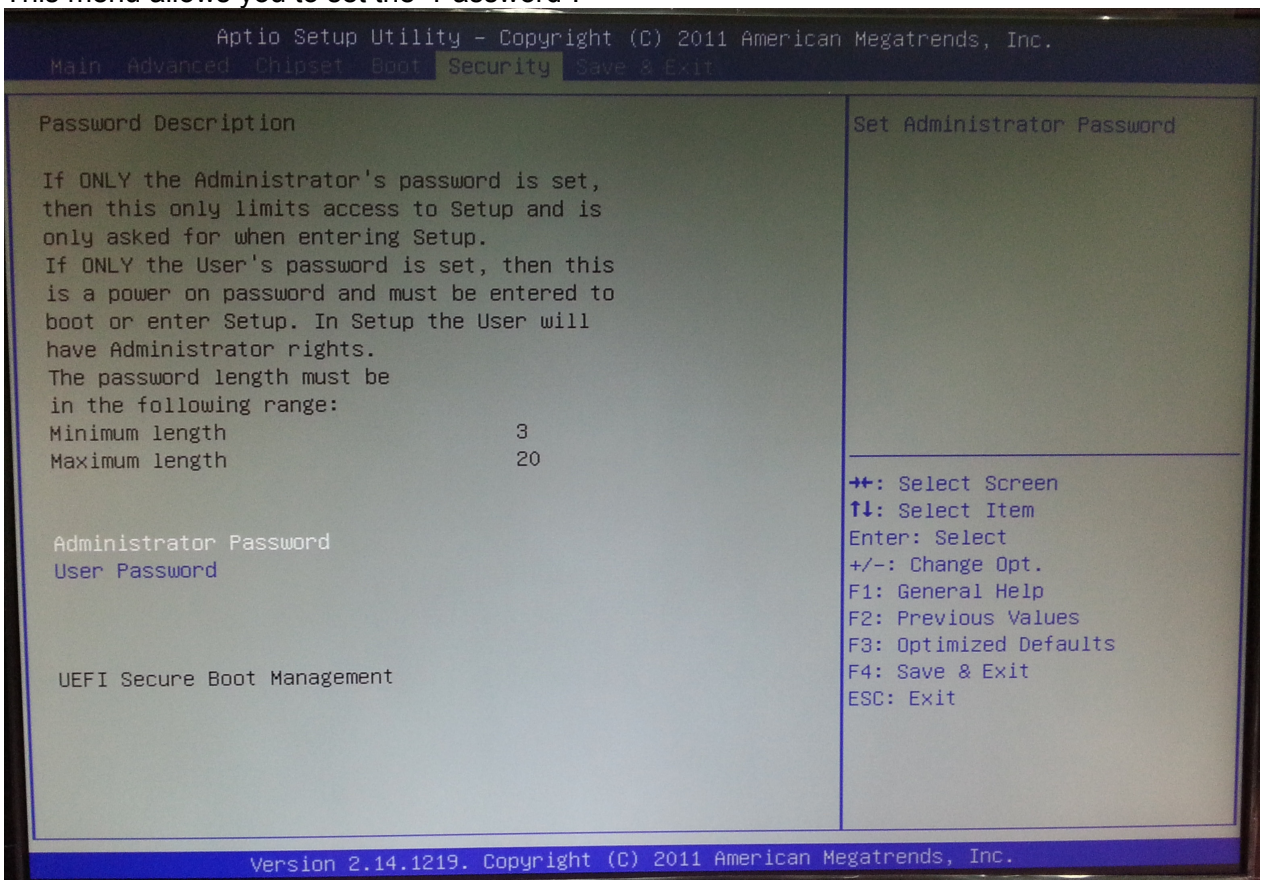
This menu allows you to set the “Boot Configuration”. You can make changes as necessary.



▲ Boot

Setup 5: Power Management Setup

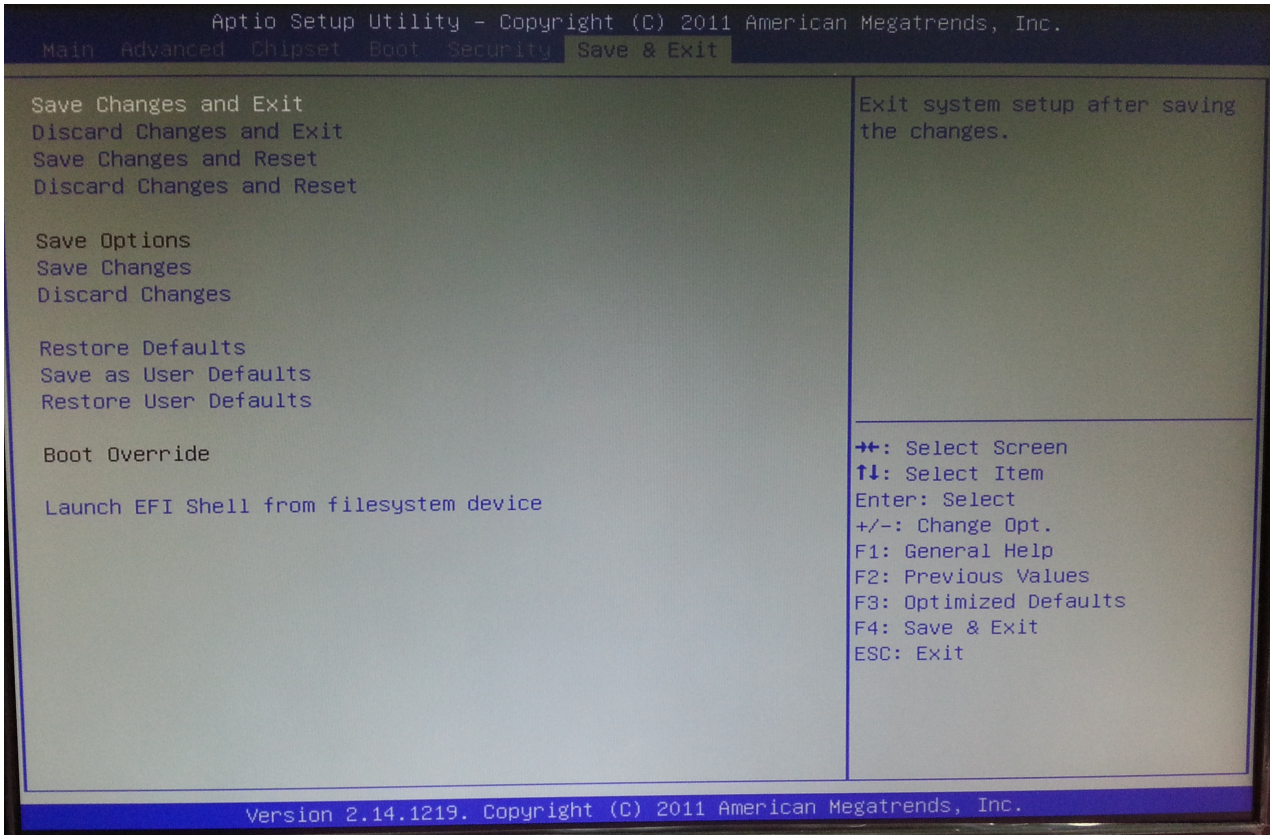
This menu allows you to set the “Password”.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
UEFI Secure Boot Management
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

▲ Power Management Setup

Setup 6: Save and Exit Setup

To save any changes you made to the BIOS you must choose this option.



▲ Save and Exit Setup

4.0 DRIVER INSTALLATION

The REC431X comes with a CD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:
Step 1 – Install APU Driver
Step 2 – Install LAN Driver
Step 3 – Install Audio Driver

USB 2.0 Drivers are available for download using Windows Update for both Windows XP and Windows 2000. For additional information regarding USB 2.0 support in Windows XP and Windows 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation:
Insert the SB35-G2000 DVD-ROM into the DVD-ROM Drive. And install the drivers from Step 1 to Step 3 in order.

Step 1 – Install Intel APU Driver
1. Click on the ***APU Driver*** folder and select the OS folder your system is
2. Double click on the ***setup.exe*** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 2 – Install Intel LAN Driver
1. Click on the ***Ethernet Driver*** folder and select the OS folder your system is
2. Double click on the ***setup.exe*** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 – Install Audio Driver

1. Click on the ***Audio Driver*** folder and select the OS folder your system is
2. Double click on the ***setup.exe*** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically